

### ABSTRACT OF THE DISCLOSURE

The present invention provides a method and system for operating a wireless communication system in which received signals from a plurality of antennas are weighted and combined with a beam forming operation to form an output signal. The beam forming operation determines weights adjusted to increase a desired signal power in the output signal while reducing the power in the output signal of out-of-band components. In an embodiment of the present invention, beam forming operations are performed with maximal ratio combining (MRC). Alternatively, a constant modulus algorithm (CMA) can be used for beam forming operations. In an alternate embodiment, improved interference suppression is performed with a novel algorithm referred to as an interference nulling algorithm (INA). The INA receives an error signal which is 180° out of phase with a combination of the channels for individual antennas, referred to as the SUM channel. The error signal is determined by complex conjugate multiplication of the individual signals and a reference complex signal. It is desirable to simultaneously achieve diversity and combining gain and suppress the adjacent channel by combining the weight generation for MRC and that for INA, as described above, to generate antenna weights similar to those of MMSE combining.